

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[002] The present invention relates generally to metal frame assemblies such as door frames, window frames and the like and more particularly to an adjustable metal frame having an adjustment mechanism that permits attachment of the frame in a manner that can alter the frame dimensions during installation.

BACKGROUND ART

[003] Modern residential and commercial building techniques make it extremely desirable to permit the fabrication and installation of metal frame assemblies such as door frames, window frames and the like into a pre-existing wood frame or steel frame structure in an expedient manner. As a result, metal frame assemblies have become extremely popular because they can be economically and expediently installed onto standing wood frame or steel frame studs, the individual metal frame assembly pieces being prefabricated and brought to the site. One significant advantage of using prefabricated metal framing systems is the fact that the various component surfaces may be readily manufactured to relatively stringent tolerances to provide smooth precise surfaces having appropriate dimensions and angles for the installation.

[004] Despite such stringent tolerances, it is often necessary to adjust the dimensions between frame members to accommodate irregular or improperly dimensioned openings between wall structures where a door or window frame is to be installed. Door and window frames must be precisely dimensioned to received standard size doors and windows. However, it is common for the distances between the ends of adjacent walls where an opening is left to receive such frames, to be too large or otherwise imprecise

such as not precisely parallel or perpendicular. Therefore, it is often necessary to adjust a frame member relative to the end of the opening to compensate for such errors during frame installation. For example, it is often necessary to adjust the extent to which a vertical door frame overlaps the end of an adjacent wall end, i.e., less overlap when the opening deviates more and more overlap when the opening deviates less. It is also often necessary to provide more overlap at one end of the vertical door than the other to offset a wall end which is not truly vertical. Conventionally, such adjustments are made by manually altering the frame member position during the installation process. However, there is an inherent difficulty for the installer in supporting the frame member for adjustment and installation simultaneously. Such difficulty often leads to mistakes that require removal and re-installation and in any case often adds considerably to the time required to complete a proper and accurate installation process.

[005] It would therefore be highly advantageous to provide a metal frame system having frame members with a built-in adjustment feature that would permit the aforementioned adjusting capability in the frame member itself. Such an integral adjusting capability would permit an installer to provide precise door and window frame construction in a much more convenient and efficient manner than can shorten the installation process.

SUMMARY OF THE INVENTION

[006] The present invention comprises a metal frame system wherein each frame member has one or more integral adjusters configured for selective extension from the frame member in a direction that is perpendicular to the length of the member. Each adjuster comprises a support bar or member having a threaded central passage aligned with a bolt hole through the frame member. The support bar is preferably spot welded across the interior of the frame member in a position parallel to the width of the member and spaced from the front edge of the member. The adjuster also comprises a pair of concentric tubes including a hollow outer tube and a fully threaded inner tube. The outer tube is positioned between the bar and the front edge and is spot welded to the bar. The inner tube is welded to a large washer providing a bearing surface and positioned behind the bar and is threaded through the central threaded bar passage. By rotating the inner threaded tube, the large washer is selectively positioned behind the bar a distance which may be adjusted. The inner tube is provided with a slot adjacent the frame member bolt hole. An adjusting tool may be inserted through the bolt hole from the front of the frame member and inserted into the slot in the inner tube to rotate it and thus adjust the position of the washer from the exterior of the frame member. The position of the washer determines the total depth of the frame member and thus the extent to which the front edge of the frame member extends from the end of a wall forming the opening into which the frame is installed.

BRIEF DESCRIPTION OF THE DRAWINGS

[007] The aforementioned objects and advantages of the present invention, as well as additional objects and advantages thereof, will be more fully understood hereinafter as a result of a detailed description of a preferred embodiment when taken in conjunction with the following drawings in which:

[008] FIG. 1 is an elevational view of a typical door frame installed using the present invention;

[009] FIG. 2 is a partially cross-sectioned, partially exploded view of an adjuster of the invention and its associated adjusting tool;

[0010] FIG. 3 is a cross-sectional view taken along lines 3-3 of FIG. 2;

[0011] FIGs. 4 and 5 are respective top cross-sectional views taken along lines 4-4 of FIG. 1 for two distinct degrees of adjustment;

[0012] FIG. 6 is a cross-sectional view of the adjuster of the invention showing the use of the adjusting tool; and

[0013] FIG. 7 is a cross-sectional view of an optional additional lower hinge adjustment device used to help bear the weight of the frame during installation.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

[0014] Referring to the accompanying drawings, it will be seen that a door frame assembly 10 comprises a pair of vertical frame members 12 and a horizontal frame member 20. Each such frame member comprises at least one adjuster 14 which, as will be seen hereinafter, permits adjustment of the frame members relative to the adjacent walls 18 to accommodate a standard size door 15.

[0015] As seen best in FIGs. 2 through 6, each adjuster 14 comprises a rectangular bar 22 which is spot welded at spots 24 to the frame member 12. Each bar has a threaded hole 29 which is axially aligned with a bolt hole 13 in the frame member. Each adjuster also comprises an outer tube 26 and a concentric fully threaded inner tube 28. The outer tube 26 is also spot welded in place. The threaded inner tube is threaded through threaded hole 29 and the end of tube 28 beyond bar 22 is welded to a large washer 30. The other end of threaded tube 28 is provided with a pair of slots 32. The adjuster is operated with the aid of a tool 34 which is a hollow elongated tube having a pair of tips 36 at one end and a hex head 35 at the other end. The tips 36 are designed to mate with slots 32 in inner threaded tube 28 to turn the tube 28 and thus advance washer 30 through bolt hole 13. An un-threaded bolt 38 having a tapered tip 39 and a hex head 37 is preferably used with tool 34 as a simple centering aid wherein bolt 38 is inserted through tool 34 as shown in FIG. 6 to facilitate engagement of tips 36 into slots 32 through bolt hole 13.

[0016] FIG. 7 illustrates an optional weight bearing adjuster 16 which may be deployed at the lower hinge of a vertical frame member to bear the weight of the member until the lower hinge is installed. Adjuster 16 comprises a bearing washer 40, the position of which is determined by the relationship between an interior threaded tube 42 and bolt 44 to which the washer is welded. A shim 46 may be employed to spread the force over a greater area.

[0017] Having thus disclosed a preferred embodiment, it will now be apparent that the invention herein provides a highly advantageous adjustment feature for door and window metal frame systems that makes installation far more convenient and less time consuming. It will be understood that the scope hereof is not limited by the disclosed embodiment. By way of example, the adjuster herein can be readily configured without a support bar if the outer tube were threaded internally instead. Moreover, in some configurations, the outer tube may be omitted leaving only the threaded inner tube. Therefore, the protection hereof is limited only by the appended claims and their equivalents.

[0018] I claim: